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ABSTRACT

The Clinicians Health Channel (CHC) is a World Wide Web site providing online access to current, accurate and reliable sources of information to help inform and assist clinicians in decision making, research, and education. Resources include an electronic health library with citation databases and full text journals, links to other clinical reference materials, such as guidelines and protocols, and provision for discussion forums on clinical topics. An interdisciplinary, collaborative team from the University of Melbourne (Australia) is undertaking an evaluation to determine how successfully the introduction of the CHC has met its original aims specifically in relation to the development, implementation, and impact on changing behavior and increasing usage of evidence based health care. A number of key research areas have been identified as important to the evaluation and development of the CHC. These identified research areas fall naturally into the three dimensions--technical, social, and behavioral--of our conceptual framework for the evaluation of the CHC. This paper examines the progress on the three-year evaluation of the CHC. It examines the evaluation approach, methodology, and insights obtained at the end of Stage 1 of the evaluation. (Contains 12 references.) (MES)

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A COLLABORATIVE INTER-DISCIPLINARY APPROACH TO THE EVALUATION OF THE CLINICIANS HEALTH CHANNEL

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Abstract

The Clinicians Health Channel (CHC) is a web-site providing online access to current, accurate and reliable sources of information to help inform and assist clinicians in decision making, research and education. Resources include an electronic health library with citation databases and full text journals, links to other clinical reference materials, such as guidelines and protocols, and provision for discussion forums on clinical topics. An inter-disciplinary, collaborative team from the University of Melbourne is undertaking an evaluation to determine how successfully the introduction of the CHC has met its original aims specifically in relation to the development, implementation and impact on changing behaviour and increasing usage of evidence based health care. A number of key research areas have been identified as important to the evaluation and development of the CHC. These identified research areas fall naturally into the three dimensions - technical, social and behavioural - of our conceptual framework for the evaluation of the CHC. This paper examines the progress on a three-year evaluation of the CHC. It examines the evaluation approach, methodology and insights obtained at the end of Stage 1 of the evaluation.

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Keywords
evaluation, web-based resources, focus groups, interviews, questionnaires

Rationale

Clinical decisions about options for a patient's care should be based on both individual clinical expertise and best available external clinical evidence (Sackett, Rosenberg, Gray, Hayes & Richardson, 1996). However, it has been estimated that for the medical profession to keep up to date with advances in drugs, treatment and technology alternatives, they would need to read 19 articles per day, 365 days of the year (Evidence-based working group, 1992). Computerised information resources, comprising both synthesised evidence and original research, made available to clinicians via telecommunication are increasingly being advocated because it is believed that they can provide better access to and use of the evidence to allow the clinician to keep up to date and enhance the quality of care (Lindberg, Siegel, Rapp, Wallingford & Wilson, 1993; Elson & Connelly, 1995).

However, these resources have had limited use in direct patient care settings, meet only a small part of clinicians' information needs, and have not had significant impact on clinical practice. While some may disagree with the need to prove benefit to advocate the use of information resources, most will agree with the need for further research into the content and delivery methods as well as the social and behavioural impacts of such resources on clinicians, their patients, work practices and organisations (Gorman, Ash & Wykoff, 1994; Covell, Uman & Manning, 1985; NHS Centre for Reviews and Dissemination, 1999; Hersch & Hickam, 1998). Our evaluation is thus concerned with the use of evidence-based information in the context of clinical practice, and with the use of web-based media to facilitate evidence based practice. In line with these views the Department of Human Services embarked on a plan to integrate existing information sources in an attempt to change clinical work practices by improving decision-making capability using electronic sources of information. The result of this ongoing work is the Clinicians Health Channel.

Clinicians Health Channel

The introduction of the Clinicians Health Channel (CHC) is a four-year project which aims to provide equity of access to critical clinical knowledge resources for clinicians in the public health care sector throughout Victoria. The CHC (online) is a web-site providing online access to current, accurate and reliable sources of information to help inform and assist clinicians in decision-making, research and education. The CHC aims to facilitate electronic dissemination of these resources so that the information can be accessed whenever and wherever required. It is thus used to support integration of evidence based practice into the health care system. It allows access to an electronic health library with citation databases and full text journals, links to other clinical reference materials, such as guidelines and protocols, and provision for discussion forums on clinical topics.

Rationale for Evaluation Approach

Our approach to the evaluation is notable in three key respects. Firstly, the evaluation is conceptualized as the evaluation of strategic change to work-practices, not simply as the evaluation of a web-site. Secondly, and as a consequence of this broad conceptualisation, the team is multidisciplinary - made up of people with experience and expertise in medicine, multimedia design, educational evaluation, socio-technical relations, workplace ethnography, and qualitative and quantitative research methods. Thirdly, the approach is one that intends to be formative as well as summative, and takes the CHC to be an emergent system rather than stable or fixed.

Evaluation of the Clinicians Health Channel

The evaluation is an integral part of improving the quality and usefulness of the CHC. The University of Melbourne team has adopted a collaborative approach to research and evaluation of the CHC, and the wide range of disciplines represented on the team is a major strength. The evaluation focuses on issues related to professional clinical practice (specifically, an anticipated increase in the practice of evidence-based health care), and on issues related to technological mediation (specifically, the use of the web to achieve this objective). These two intertwined research areas require an analysis through three dimensions – technical, social and behavioural – and these constitute our conceptual framework for the evaluation of the CHC.

Technical Dimension

This focuses on the CHC as an artefact, its representation of the context, its construction of the user, and its reconstruction of a professional knowledge base. It addresses and evaluates the aim of the CHC to facilitate electronic dissemination of these resources and other clinically relevant information, so that the information can be accessed whenever and wherever required. The evaluation will examine the useability of the system in terms of functionality, frequency of use, purpose of use, user satisfaction, user friendliness, time required to locate information, searching utility, success or failure of searches for relevant information, flexibility, and customisation. Training and support will also be examined here as we consider it an integral component of the CHC Program. Evaluation areas will include teaching and learning needs, critical appraisal skills, evaluation of teaching and learning, best practice teaching methods, training models, and the development of a tool kit for trainers.

Social Dimension

This focuses on the regional, institutional, professional and education context in which clinical practice occurs. It acknowledges the fact that the CHC is situated in particular social spaces and is attentive to those spaces. It addresses and evaluates the aim of the CHC to provide equity of access to critical clinical knowledge resources for clinicians in the public health care sector throughout Victoria. The evaluation questions will include the "who, when, where" as well as impacts of the CHC on accessibility of resources.

Behavioural and Professional Dimension

This focuses on the extent and character of the intersection or overlap of the CHC Program and evidence based practice. It addresses and evaluates the aim of the CHC to support integration of evidence based practice into the health care system. The evaluation will address the use of the CHC by clinicians and whether it met their information needs. We will identify knowledge resources, awareness of available resources, ability to access these, current usage patterns and factors influencing utilisation. The evaluation will also address any impact on decision making by measuring clinician change and examining the barriers/opportunities, any relevant forces at work, and strategies to positively influence behaviour.

This evaluation study will capture a broad range of contributions that the CHC may have made (and may continue to make) to clinical practice by using multiple and different evaluative criteria and gathering data from a variety of sources. The outcomes achieved by the CHC, and the impacts of this achievement on various professional groups, need to be analysed from a number of different perspectives (clinician, patient, manager, educator) and across a number of different dimensions (technical, social and behavioural). Priority will be given to analysing the impact of the CHC on clinician behaviour. It is important to emphasise that it is the clinicians who are in the strategic position to determine the frequency and nature of CHC use, and the implications of the CHC Program flow from clinicians' decisions and behaviour. The data collection, analysis and interpretation will recognise this important fact.

Methodology

Bearing in mind the aims and objectives of the CHC and the evaluation areas identified, the evaluation will address the following questions:

1. What research has already been conducted which might cast light on the implementation of evidence based clinical practice, and the design and use of health informatics systems?
2. What is the state of current practice and current attitudes among clinicians in relation to evidence-based health care?
3. What is the state of current practice and current attitudes among clinicians in relation to computer-based information systems?
4. Are the CHC's methods for presenting and delivering information meeting the specific needs and expectations of clinicians?
5. Are the knowledge resources provided by the CHC utilised in everyday clinical practice?
6. What factors are facilitating and/or impeding this utilisation?
7. What strategies are influencing clinical behaviour and choice of knowledge resources?
8. Is the information accessed through the site assured with regard to quality, validity and relevance?
9. Does the CHC work effectively with respect to state-wide communication of knowledge for clinicians?
10. Is the clinical knowledge equitably distributed across the state, taking the size and rurality of hospitals into account?
11. What changes occur in all of the above over the three year period of the evaluation?

Since the evaluation will involve technical, social and behavioural dimensions, data collected will be both qualitative and quantitative. To address the evaluation questions stated above, the following methods will be employed:

- Focus groups with medical, nursing and allied health staff
- Individual interviews with medical, nursing and allied health staff
- Direct observation of clinician access and usage of CHC and other information resources and utilisation of these resources in everyday clinical decision making practices
- Online log analysis of usage of CHC
- Paper based user questionnaire survey
- Online user survey

The three-year evaluation has been divided into four stages. The following provides an overview of the stages for the evaluation project.

Stage 1 Baseline Evaluation (0-12 months)

The first stage of the baseline evaluation comprises a paper based questionnaire survey, focus groups and interviews. Over 600 surveys have been distributed throughout Victoria. Participants for the focus groups and individual interviews have been recruited from six sites chosen to represent a range of size, rurality and level of enthusiasm and readiness (infrastructure and organizational processes) for the CHC. Participants have been recruited on the basis of whether they are medical, nursing or allied health staff and whether they are novice or experienced users of the CHC. The aim of this stage of the evaluation is to have a mix of professional disciplines as well as a mix of novice and experienced users of CHC.

Stage 2 Evaluation (12-18 months)

At this stage of the evaluation, data collected during Stage 1 (paper-based questionnaire survey, focus groups, interviews) will have been analysed and will be used to inform the Stage 2 evaluation. For Stage 2, three of the six original pilot sites will be re-evaluated after at least six months implementation of CHC. At each of these three sites, repeat focus groups and individual interviews will be carried out, in addition to online log analysis of CHC usage. In addition to the methods that were used in Stage 1, a number of additional methods will be used to collect relevant information. An online user survey will be developed based on the findings from the baseline evaluation. In contrast to the paper-based survey, this questionnaire survey will be administered online to users in participating sites. Users will be requested to complete the online survey when

they visit the Channel. Another method will involve direct observation of clinician use of the CHC. The evaluation team will use a number of the evaluation sites to collect ethnographies of clinician use of CHC. This will involve close observation of the ways that clinicians use online information resources, including CHC, in their everyday clinical decision making practices.

Stage 3 Evaluation (18 -24 months)
Stage 3 evaluation will involve:
Continued online log analysis of usage of CHC
Continued online user survey.

Stage 4 Evaluation (24 -36 months)
Stage 4 evaluation will involve:
Final paper based user questionnaire survey
Continued online log analysis of usage of CHC
Continued online user survey.

Progress

Paper-Based Questionnaire
The first stage of the baseline evaluation comprised a paper based questionnaire survey (online). This survey has been provided to both users and non-users of CHC across Victoria. We focussed on both users and non-users of the CHC as we wanted to begin with how clinicians make decisions before investigating how clinicians use electronic sources of information for making decisions. Over 600 surveys were distributed across Victoria to 114 hospitals. Thirtyfive were sent to librarians while others were distributed through rural coordinators. Two hundred and thrity three surveys were returned. This survey will collect baseline data for the evaluation prior to the complete roll out of CHC state-wide. The responses from the survey provide primarily quantitative evaluation data which should inform and complement the qualitative data that has been collected in the focus groups and interview questions. The data entry has been completed and preliminary analysis has been completed.

Demographic Information about the Respondents

In all, 153 female and 75 males responded to the survey. The average number of years respondents worked in the health care profession was 18.65 years. Fifty-five allied health, 49 medical doctors, 102 nurses and 26 others (managers, administrators, etc) responded to the survey. A detailed examination of the survey results will not be examined in this paper. However we will examine one question from the survey: how do clinicians use information resources in making a clinical decision-making. This examination should provide an insight into the different types of resources utilised by clinicians. The table below gives the percentage of the 233 respondents that marked the box for each response. Respondents were able to check as many responses as they liked.

The top four resources used to:

- *guide current treatments* included: paper-based clinical guidelines and protocols, workshops/seminars, journals and consultation with peers.
- *assist with diagnosis* included: consultation with peers, textbooks, journals and academic-based websites.
- *check patterns of illness* included: textbooks, journals, consultation with colleagues and internet search engines.
- *confirm my actions* included: consultation with colleagues, paper-based clinical guidelines and protocols, workshop/seminars and textbooks.
- *refresh my knowledge* included: workshop/seminars, conferences, textbooks, journals.
- *access local information* included: staff meetings, local services directory, consultation with colleagues and workshops/seminars.
- for *background research* included: journals, academic based websites, internet search engines and computer-based journals.

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How do you use **information resources** in your clinical decision making?

Information Resources	Guide current treatment	Assist with diagnosis	Check patterns of illness	Confirm my actions	Refresh my knowledge	Access local information	Background research	*Overall*
People Based								
Conference	61	18	21	45	83	36	42	*90*
Consultation with colleagues	70	59	40	83	52	55	28	*97*
Staff meetings	42	17	20	42	36	59	16	*84*
Workshops,seminars	75	30	29	52	85	45	44	*94*
Paper Based								
Clinical guidelines & protocol	78	33	26	60	54	28	34	*90*
Journals	73	43	41	43	72	21	66	*92*
Local handbook	27	15	12	23	20	32	9	*56*
Local services directory	6	3	2	6	6	59	6	*61*
Textbooks	52	58	46	49	73	9	57	*89*
Computer Based								
CD ROMS	30	18	16	18	35	11	30	*49*
Internet search engines	51	30	32	30	53	25	61	*75*
Academic based sites	55	36	29	32	54	18	65	*73*
Other internet sites	30	17	21	20	35	20	42	*59*
Clinical guidelines & protocols	52	23	14	39	37	20	30	*65*
Journals	53	29	27	33	50	15	57	*67*
Local handbook	13	9	4	10	11	21	6	*31*
Local services directory	4	2	3	5	6	36	3	*39*
Textbook	31	31	24	27	37	8	35	*49*

Overall *refers to percentage of respondents that use the information resources for at least one of the activities listed.*

Table 1: Information resources utilised by clinicians (doctors, nurses, allied health) to make a clinical decision

As seen from the above analysis clinicians carefully choose information resources appropriate for the function. Understandably there is an emphasis on consultation with colleagues to guide current treatments, assist with diagnosis, check patterns of illness, confirming actions and accessing local information. Electronic resources appear to be extensively used for background research as opposed to obtaining point of care information.

Focus Groups

Eight focus groups have been completed at a variety of evaluation sites. Participants for the focus groups were recruited from six sites chosen to represent a range of size, rurality and level of enthusiasm and readiness (infrastructure and organizational processes) for the CHC. The focus groups were conducted as open-ended interviews on targeted or focussed issues surrounding the introduction of computer-based resources to Victorian public hospitals. The sampling for the focus groups typically involved bringing together people of similar backgrounds and experience to participate in a group interview about major program issues that affect them. These were led by an experienced and impartial facilitator. The job of the facilitator was to guide the group discussion and ensure that all participants had the opportunity to put forward their views.

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A number of consistent questions were utilised throughout the focus groups by the facilitator. The following provides a brief summary of insights gained throughout the early stages of the focus groups.

Question 1: Is Evidence Based Health Care (EBHC) widely practiced in your work environment? Initially it was necessary for the participants to define EBHC. It was defined as:
'Basing your decisions on published information or actual data'.
Another participant suggested that:

> *'I think the clinical environment is very sympathetic to the practice of EBHC. I think that the tools of engagement for individual clinicians to use are difficult to use and I don't think – the EBHC movement has failed to appreciate the need to create a mechanism for engagement'.*

Question 2: What sorts of professional/clinical factors influence your clinical decision-making?
Generally comments suggested that decision-making is currently based on peer consultation:

> *'We practice a lot of our decision making* [through] *consultation with peers. We're lucky that we have a big department, a lot of staff and we have a lot of peers and colleagues so we can bounce things off each other all the time as opposed to a smaller department.'*

This finding is consistent with the survey results which also suggest an emphasis on consultation with peers for many point of care decisions.

Question 3: Has computer use changed the way you work? How?
In one department that has computerised their clinical guidelines:

> *'People are quite familiar going to a computer to assist them in making a decision'.*

In this department, these computerised guidelines have also been useful to new staff:

> *'Junior medical staff who were perhaps a little hesitant about asking the consultant use it all the time – do I ask them again, how do I manage this simple fracture. You'll see them and they'll be often scrolling through it to not appear to be novices I suppose'.*

Question 4: In relation to online computer resources, do you use these kinds of information resources to support your clinical decision-making?

> *'People still tend to rely on people who are familiar and know how to use the system rather than learning how to use the system.'*

Some suggested that they wanted:

> *'Predigested information on specific topics that you encounter frequently in clinical practice...'*

Others wanted:

> *'a readers digest version, you want to know what to do and you want to know quickly...'*
> *'For unusual cases you want to be able to identify relevant literature and examine it yourself'.*

Question 5: Do you have any comments related to the Clinicians Health Channel?

> *'We have phone calls from people that used to work in the department that know about guidelines, say they are working in Bendigo or Shepparton or a rural hospital they'll ring up, its 3 o'clock in the morning I've got a such and such can you fax me or email me the guidelines because I've got a patient here with it. So rather than have to do it the manual way it would be nice for everyone to be [connected via an] intranet'.*
> *'Any web site [requires] minimum key strokes – like to get the information quickly. So even if our computers are slow or fast, if you've just got the function keys to get into certain things rather than accessing all the sub menus – short cuts'.*
> *'If it makes it easier for them to do their job they'll knock your door down to get to this. Some don't realise it; some are scared by just the technicality and the ease of use, the facility. They are used to being winners and I think you've got to play to their cultural strength...'*

Interviews

Interviews were structured around the themes of the study – in this case information needs, resources use and computer experience. The project interviews were semi–structured, with questions asked around the themes and opportunity for interviewees to discuss other related issues. This research project aims to explore the usefulness of the CHC, therefore, it is important that the

research tools allow for exploration and do not limit participant responses unduly. Interviews allow for participants to be asked for detailed personal accounts. The use of an interview format can facilitate the collection of anecdotal information, allow for fuller responses by participants and the opportunity for unforeseen information exchanges to occur. Twenty-four interviews have been undertaken and are currently being analysed.

Preliminary Examination of Interviews

In the preliminary analysis of interviews there appears to be a number of consistent themes. In particular there were numerous comments on the applicability of databases for research as opposed to point of care information. For instance some databases provide background research whereas others provide specific point of care information. It is also a consistent theme that clinicians desire a 'readers digest' of pertinent information and that access to suitable computers would assist CHC usage. It is also suggested that informal training and support is more appropriate then formal large group sessions. Understandably, isolated rural clinicians also desire access to other professional colleagues or people resources. The use of a 24 hour help desk could provide assistance to the isolated clinician. A number of specific comments have been provided to exemplify these themes.

Posting Questions/Discussion Groups

'I suppose if there's one thing that could be added to an online server it would be posting questions. Where a professional dilemma, a diagnostic dilemma – so if you are remote and you are removed from colleagues and you can't just go to the residents quarters and discuss it with the registrar – you are able to put it online so you can discuss it with a hematology registrar within that system'.

Different functions of Databases

'I think Medline is brilliant if you're doing a Ph.D. If you're doing your MD in an interesting area then it's very useful.'

Corroboration in Decision Making

'The problem is... that ... there is always the risk that, guidelines are out of date the moment they are written and not every database is accurate ... I think its important that people realise that you need more than one resource. If you really do have a clinical problem you need to corroborate with several resources'.

'Ultimately that's what a good single site is about. Where it can offer you two or three different opinions, so that you can be reasonably sure that the decision you're making is based upon current practice and evidence. Whatever is on there, there should be at least one or two different approaches for a problem. I don't trust any one person or any one thing; I need to have several approaches before I agree to anything'.

'A patient I saw on the ward who was diabetic and had high blood pressure. I was asked to decide what sort of blood pressure medication to prescribe. I chose a particular type because of the recent trial that came out ... I guess I probably found that out at a clinical meeting first of all as opposed to a database.'

Abstracts versus Full Text Journals

'Obviously access to the journals is important – okay I can access Medline but you only end up getting the abstracts, which is never really enough. To go that next step and have the full text for downloading is so important. A lot of cases that we see there isn't a lot of information available, like those stinging jellyfish here a few weeks ago and it took a long time to sort out what sort of jellyfish they were and what the best treatment was. Nobody could identify it, how do you find the person who can identify it. These are the things that smart technology should be able to overcome. The internet is the perfect way of doing it. ...So I think the future is very bright. It's an absolutely essential tool.'

'...it takes so long to get to the information. I know textbooks; I know where they are. If it's something very esoteric I might go on the internet because I know you can find a wealth of information. I do find it somewhat arduous navigating through all the tiers'.

Conclusion

Overall this paper has outlined our rationale, approach and evaluation strategies. Our project website (online) continues to update our latest findings in relation to the three year evaluation. Stage 1 of the evaluation has been completed. A number of methodological approaches have been utilised including questionnaires, focus groups and interviews. In particular the evaluation team have obtained an insight into what information resources clinicians utilise and how these are differentially utilised dependent on the clinical function. Both focus groups and interviews provided an insight into what clinicians desire at the point of care. In particular the use of predigested 'readers digests versions' of clinical findings appear to offer promise. Database resources that offer the ability to obtain an abstract as well as full text versions of appropriate resources need to be emphasised. Our next step has been to evaluate the CHC website and recommend additional functionality for the website. It may be appropriate to consider the use of frequently asked questions, a site map, discussion forums, a search button, and help. In addition the website should provide recommendations to professional groups regarding information needs and recommendations to novice and experienced clinicians. The use of web-based clinical scenarios is also being considered to reinforce navigation and use of the resources on the Clinicians Health Channel.

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